

The Effects of Depression and Anxiety

*- An Investigation of Why Some People are More
Susceptible to the False Memory Effect*

Ingunn Vaadal



Master's Degree in Psychology

Department of Psychology

University of Oslo

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Ingunn Vaadal

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1. Abstract

It is argued that maladaptive, over-activated self-schema and source-monitoring failure within depression and anxiety may make an individual more prone to the false memory effect. Derived from Beck's cognitive theory it was speculated that a possible association with depression, anxiety and false memory creation, could be a pathological mechanism to explain the development and maintenance of these affective disorders. The available literature did not allow strong prediction to be made on the extent of false memory creation within depression and anxiety. The main reason is that there is few studies that have investigate this questions, and partly because the existent results is various. It was expected to replicate the mood-congruent effect within depression, though some recent research causes some warnings of this effect. In the present study sixty-seven participants filled out Beck Depression Inventory-II, Beck Anxiety Inventory, Creative Experiences Questionnaire and Dissociative Experience Scale in addition to a version of the Deese-Roediger-McDermott (DRM) paradigm. Twenty lists, 10 neutral and 10 depressive-related were presented to participants in sequence, following by a recognition task. The words in each list were associated with a central but unmentioned theme word that was either neutral or depressive-related. The results suggest that anxiety and depression is associated to false memory creation, but depression correlated only to recognition of neutral critical lures. There was no correlation with fantasy proneness in relation to false memories. Dissociation was associated with a false memory effect. Clinical and empirical implications of these findings and models are further discussed.

2. Introduction

Why are some people more susceptible to making errors when they are stimulated to create false memories? Researchers around the world have contributed to the study, how false memories arise. The very concept of false memory underlines the fact that memory is not a literal reproduction of the past but instead depends on constructive processes that are sometimes prone to errors, distortions, and illusions (Schacter, Norman, & Koutstaal, 2000). More importantly, the results have had enormous theoretical implications for our understanding of how the mind works, as well as practical implications for legal, psychological, and other real life settings (Wade, Sharman, Garry, Memon, Mazzoni, Merckelbach & Loftus, 2007). False memory research has been criticized many times, specifically for misusing the term «false memory», and relying on the wrong methodologies to study false memory, and misapplying false memory research to real world settings (e.g. Freyd & Gleaves, 1996; Pezdek & Lam, 2007). However, these claims are based on an incomplete coverage of false memory literature or mistaken inferences about what the literature reveals (see Wade et al., 2007 for review). The real question is not whether or not research into false memories has been misguided, but how natural occurring variables act to increase or decrease the probability of false memory creation.

There is growing evidence that the tendency to exhibit false memories varies as a function of individual differences (Roediger & McDermott, 2000). However, there are still only a few studies that address these issues. Most research on individual differences has focused on traits such as dissociation (e.g. Winograd, Peluso, & Glover, 1998; Wright, Startup, & Mathews, 2005), fantasy proneness (e.g. Geraerts, Smeets, Jelicic, van Heerden, & Merckelbach, 2005; Horselenberg, Merckelbach, van Breukelen, & Wessel, 2004), suggestibility (e.g. Kassin, 1997) and absorption (e.g. Drivdahl & Zaragoza, 2001).

False memory creation is associated with failures in source monitoring; the process of remembering how, when and where memories were acquired. Curiosity enough, a considerable body of evidence has indicated that people with depressive symptoms suffer from substantial memory impairment (for review see Veiel, 1997), but still, few studies have investigated source monitoring with depressive individuals. Focus in research of depression has instead been on e.g. attentional deficits, lack of motivation and impaired cognitive initiative (Ellis & Moore, 1999).

Since depression has received little attention in prior research on individual differences in false memories, we do not know whether depression make individuals prone to false memories or not. However, it is well documented that depression is related to memory impairment. One of the most influential theories of depression and anxiety, Beck's cognitive theory, postulates that both anxiety and depression are characterized by systematic distortions in information processing. To understand the distortions seen in anxiety and depression, Beck's employs the construct of schema. Self-schema is organized representation of prior knowledge which guides the current processing of information (e.g., Clark, Beck & Alford, 1999). An over-activation of certain maladaptive schema is thought to be characteristics for both anxiety and depression, and lead to a greater degree of perceptual sensitivity and memory bias for information congruent with one's predominant self-schema (Mineka & Nugent, 1995).

In general, Beck's cognitive theory, argues that distortions in thinking and memory is the cause of depressive and anxiety symptoms, rather than visa versa. A review of the empirical literature by Clark et al. (1999), supports the idea that negative cognitive organization plays a important role in development of a depressive experience. In the present study, we examine the hypothesis that individuals with depression or anxiety have deficits in source monitoring, resulting in increased likelihood of false memories. If depression or anxiety is associated with false memories, this may be an important pathogenetic factor for depressive/anxiety episodes due to

mechanism underlying depression, anxiety and source-monitoring failure. Though there has been few studies exploring depression and source-monitoring, even fewer has studied anxiety and false memory effect.

There is a final point that needs to be made at the outset. Ideally the present study should focus on both depression and anxiety, but it would not be fruitful to attempt to cover both here. There are several reasons for this, but the main one is that the coverage would be very brief. Accordingly, the main focus will be primarily on depression.

2.1 Deese-Roediger-McDermott Paradigm

As a first step toward addressing the issues just raised, one paradigm that has been used to study false memories, including errors in source monitoring, is the Deese-Roediger-McDermott (DRM) procedure. This is a well known paradigm and an effective and ethical method for eliciting false memories. In this paradigm, participants try to remember list of words, with the members of each list being associatively related to an non-presented target word, the so-called «critical lure» (Deese, 1959; Roediger & McDermott, 1995). For example, participants may study words like *bed*, *rest*, *awake*, *tired* that is strongly related to the nonpresented critical lure, *sleep*. Several studies have shown that the probability of falsely recognize nonstudied critical items is often similar to or sometimes higher than the probability of correctly recognizing associates that were actually presented in the studied DRM lists (e.g., Roediger & McDermott, 1995; Schacter et al., 2000). Moreover, studies have also revealed that warning participants about the presence of semantically related lure words in the recognition test can produce modest reductions in the level of false recognition (Gallo, Roberts, & Seamon, 1997; McDermott & Roediger, 1998). In addition, there is research showing that encoding conditions at study affect levels of false memory, such as presentation duration (McDermott & Watson, 2001), presentation modality (Gallo, McDermott, Percer, & Roediger, 2001), and levels of processing (Thapar & McDermott, 2001).

DRM paradigm has been criticized by Freyd & Gleaves (1996) for the relevance of the DRM paradigm to real world examples of alleged false memories. Especially since occurrence of false memories typically involve highly emotional events, whereas words used in the DRM paradigm are not emotionally charged. In particular, Freyd and Gleaves pointed out, the frequency of false recall and recognition in the DRM paradigm would be lowered when trauma-related items would be used, due to their emotional distinctiveness. Geraerts et al. (2005) was the first to investigate this issue by employing neutral and trauma-related DRM lists to traumatized individuals. They found that woman with recovered memories of child sexual abuse exhibited higher rates of false recall and false recognition for both neutral and trauma-related critical lures, although the effect was smaller for the trauma-related critical lures.

2.2 Theories of False Memory Effect

There are several theories that explain false memory in the DRM task. According to the fuzzy trace theory (Brainerd & Reyna, 2002; Brainerd, Wright, Reyna, & Mojardin, 2001) both a verbatim representation of the surface form and a gist representation of the meaning of a word list are formed at the time of encoding. False recall or recognition on the DRM task occurs via the gist representation because the gist trace result in a sense of familiarity for the critical lure, and the individual incorrectly ascribes this to having studied the word previously.

It is also possible to explain false recognition as a result from failure of pattern separation: studying numerous semantically related words might result in unacceptably high levels of overlap between item representations (Schacter et al., 2000). Pattern separation failure leads to impaired recall of distinctive, item-specific information, but excellent memory for what the items have in common (Schacter et al., 2000).

The two process Activation/Monitoring theory (Roediger & McDermott, 1995)

assumes that the presentation of the associate words indirectly activates the representations in memory corresponding to related words such as the critical lures (either automatically or strategically, through implicit associative responses). In the recognition test, false memory for the critical lures possibly occur when source monitoring fails, that is, when people misattribute the source of the indirect activation of the nonstudied critical lure to the direct activation that would have been produced if it had been studied. Findings show that false recognition effect were larger when semantic associates related to a particular theme word were all presented consecutively (in blocks) than when associates of different theme words were intermixed (Mather, Henkel, & Johnson, 1997), this is consistent with both source monitoring failure and pattern separation failure. Source monitoring is particularly relevant for the current research, so we deepen this more with a closer look at source monitoring and how we may fail at this.

2.2.1 Source Monitoring Framework

One of the most interesting theories that memory distortions can be understood within, is the source monitoring framework (SMF, Johnson, Hashtroudi, & Lindsay, 1993; Johnson & Raye, 1981). Within this model, SMF assumes that memories are constructed from perceptions, thoughts, beliefs, and goals active together at the time (Johnson & Raye, 2000). Thus, errors can be introduced when a memory is first acquired and anytime thereafter when it is activated and when it is evaluated (Johnson & Raye, 2000). First, episodes need to be stored in a manner that allows them to be accessed separately at test, and retrieval cues need to be specific enough to activate only a single episode (Schacter et al., 2000). Poor memories for differentiating or source-specifying details occur when these conditions are not met, and multiple episodes are accessed and details that differ from episode to episode will compete (Schacter et al., 2000). Decision making and criterion setting are then needed to evaluate whether it pertains the target episode (Schacter et al., 2000). This means that constituent features

of a memory representation are distributed widely across different parts of the brain, therefore will no single location contains a complete record of a trace of a specific experience (Squire, 1992). When retrieving a past experience this will involve a process of pattern completion, where a subset of the features composing a particular past experience are reactivated, and activation spreads to the rest of the constituent features of that experience (Schacter et al, 2000).

Remembering the source of the memory accurately is important to decide whether it is credible or not (is this a memory of a dream or a real event?). Since source monitoring is important when judging the likelihood or credibility of a memory, individuals with deficits in source monitoring will be prone to false memories (Johnson & Raye, 2000). When people are source monitoring, this is as explained based upon certain features of the memory, e.g., perceptual, temporal, and semantic (Johnson & Raye, 2000). If features of an event are poorly bound to other features during initial encoding or not consolidated afterwards, these inadequate binding can result in source monitoring failure, in which people retrieve fragments of an episode but are unable to recollect how or when the fragment were acquired (Johnson and Chalfonte, 1994). Another way source monitoring may occur is when binding processes are unimpaired, but not enough information that is diagnostic of the item's source is included in the bound representation (Schacter et al., 2000). A particular interesting factor for the current study, that can affect the extent to which other features are bound together during encoding or subsequent thinking about events, is emotion (Johnson & Raye, 2000). For example in depression, rumination may cause a polluted input that will affect plausibility and consistency checks under heuristic and systematic evaluation (Johnson & Raye, 2000). Similarly, emotional focus may produce memory deficits by increasing the chances that elaborations, interpretations, or constructions take place, thus increasing the chances for later source confusing (Johnson & Raye, 2000). The types of information we expect or require will vary depending upon our motives and expectations. How we may be more or less specific in the information we use to evaluate

the source, and therefore the accuracy of a reactivated memory, can be affected of several factors, like self-schema.

2.2.2 *Self – Schemas and False Memory Creation*

«Self-schemas» are the compilations of past experiences that influence current evaluations (Schacter, 2001). Built up over time, self-schemas contain evaluative knowledge of our own characteristics (Schacter, 2001). Beck postulate that both depression and anxiety are characterized by systematic distortions in information processing and schema is a construct to understand the distortions seen in anxiety and depression (Mineka & Nugent, 1995). The characteristic for both disorders is an over activation of certain maladaptive self-schema (Mineka & Nugent, 1995). Hence, the two emotional disorders are thought to differ regarding the content of the maladaptive self-schema (Mineka & Nugent, 1995). The theory postulates that negative self-schema are central to depression, while danger schemas are characteristic of anxiety. Therefore, individuals with negative self-schema will attend to and remember more negative information, which will lead to and maintain negative affect and depression. Individuals with highly active danger schema will attend to and remember more threatening stimuli, which will lead to and maintain anxiety. For example, a highly negative self-schema can easily lead to depression; result in chronic negative and inadequate beliefs of oneself, other people and the world (Schacter, 2001; Clark et al, 1999). Therefore, a negative self-schema provides a rich network of knowledge that facilitates encoding and later retention of negative experiences (Schacter, 2001). Thus, individuals with depressive symptoms may use their emotional state to judge the likelihood of a memory, and then give more credence to information that matches their depressive state. When individuals fail at source monitoring, this increases the probability of accepting images, fantasies, or other internally generated information as evidence of external events that never happen (Schacter et al., 2000). One could expect that depressive individuals would be more prone to false memory, and susceptible to falsely believe that a sad

or traumatic event happened to them.

2.3 Mood-Congruency Effect

A related question, which is one focus of the present study, is whether individuals with depressive symptoms also shown an enhance number of recognition of depression-related words. Cognitive research has shown that participants with depression share a pronounced bias to recall or recognize negative-valence or depression-related material more efficiently than controls (Moritz, Glascher, & Brassen, 2005; Schacter, 2001). The tendency to think negatively can facilitate the deliberate remembering of the same conceptual, negative material in a experiment (Hertel, 2004).

In contrast to research on mood-congruency effect in depression, mostly all research on mood congruency effect in anxiety has proven surprisingly negative (e.g., Nugent & Mineka, 1994; Becker, Roth, Andrich, & Margraf, 1999). When significant findings have been obtained, they have often failed to be replicated (Mineka & Nugent, 1995). One explanation may be, that although anxious individuals worries about future events, there is little evidence to suggest that they habitually ruminate about their own negative qualities (in contrast to depression), so there is no compelling reason to expect anxious individuals to display a negative recall bias following such commonly used self-referential encoding procedures (e.g., Mogg, Mathews, & Weinman, 1989).

There are several theoretical frameworks that emphasize the greater degree of conceptual processing that depressed people devote to negative materials. Some approaches propose that elaborative conceptual processing facilitates recall by establishing richer and more diverse retrieval routes (Williams, Watts, MacLeod & Mathews, 1988). The framework of transfer-appropriate processing (Roediger & McDermott, 1992) explains mood-congruent recall as established by the match between conceptual elaboration during initial task and the conceptual basis of the attempt to

remember. Under this account includes prior habits of thinking (Hertel, 2004), like this, negative self-referential materials come to mind with greater fluency, either during the initial episode to be remembered, during the test itself, or on both occasions.

Depressed individuals endorse more negative than positive words, whereas emotional healthy people tend to endorse more positive than negative words (Schacter, 2001). The existence of a mood-congruency effect is widely accepted in the literature, also because it provides a framework for explaining the emergence and maintenance of mood disturbances (Moritz et al., 2005). However, several recent studies have not been able to confirm the mood-congruency effect (Storbeck & Clore, 2005; Banos et al., 2001; Moritz et al., 2005).

2.4 Empirical Findings of False Memory Effect in Relation to Depressive Individuals

There are basically three types of study within this field: those which involve naturally occurring mood in clinically depressed individuals; those which involve naturally occurring mood in sub-clinical populations and those which involve some form of mood induction. Depression is here referred to both diagnostic categories and the self-reported state of dysphoria. «Dysphoria» is used to denote undiagnosed negative affect that for example produces moderate to high scores on the Beck Depression Inventory (BDI-II; Beck, Steer and Brown, 1996). In the literature, few studies have investigated whether depression is related to false memories (mood-congruent false recognition/intrusions). An early study (Watkins, Mathews, Williamson, & Fuller, 1992) showed that depressed patients exhibited the expected mood-congruent effect for studied items, but healthy participants display a stronger bias to produce negative-valence false recognition. Another study (Murray, Whitehouse, & Alloy, 1999) either did not find any differences between dysphoric and nondepressed participants regarding false memory. In the literature, the last study was Moritz et al., (2005) investigation of

mood-congruent false and true memory recognition in depression. Like the present study they used a variant of the DRM procedure, but only with four lists that was either depression-relevant (i.e., loneliness), delusion-relevant (i.e., betrayal), positive (i.e., holidays), or neutral (i.e., window). The results showed no significant association between depressive participants and false memory effect.

In the trauma literature, Brennen, Dybdahl, & Kapidzic (in press) investigated trauma-related and neutral false memories in war-induced Post Traumatic Stress Disorder (PTSD). Like Geraerts et al. (2005), Brennen et al. utilized the DRM procedure with both neutral and trauma-related words. Trauma-exposed participants with and without PTSD recall equal numbers of neutral critical lures, but PTSD patients were more susceptible to recall war-related critical lures. Interestingly, for the current research, was that Brennen et al. found a significant correlation between BDI and critical lure production. Measures of trauma exposures were worse predictors than the BDI score, which suggest that depression rather than PTSD seems to be more strongly related to recall of critical lures and studied words, for both word types. In other words, depression may increase the susceptibility to production of false memories. The results are interesting in the light of other findings from PTSD, where Zoellner, Foa, Brigidi, & Przeworski (2000) found that false recall was related to trait anxiety and PTSD severity. They used the DRM task to compare individuals with PTSD to traumatized individuals without PTSD and nontraumatized controls. In Zoellners et al., study only the original DRM lists (Deese, 1959; Roediger & McDermott, 1995) were used.

2.4.1 Mood Induction Research

Many studies performed with experimental mood inductions (e.g. through sad or happy music) is an effort to make causal statements about mood and memory (Hertel, 2004). The language of depression is in some of these studies used to describe the findings from negatively valence inductions

(Hertel, 2004). Since mood induction studies sometimes reveal patterns similar to those in studies based on self-reports or diagnoses, this is of interest for the present study.

Storbeck and Clore (2005) investigated with DRM procedure how affective states might influence false memory effect by manipulating individuals into either negative or positive mood. Individuals in negative moods were significantly less likely to show false memory effect than those in positive moods or those in whom mood was not manipulated. This is consistent with the predictions that were based on the affect-as-information hypothesis (Clore et al., 2001; Storbeck & Clore, 2005); if positive moods encourage relational processing, then critical lures should be more likely to come to mind to people in positive moods. If negative moods encourage item-specific processing, then such lures should be less likely to come to mind to people in negative moods, because item-specific processing tends to occur at the expense of relational processing.

Relational processing and item-specific processing is two ways to accomplished encoding. Relational processing involves encoding items in relation to other concepts in memory (Storbeck & Clore, 2005). Item-specific processing involves encoding items by their features, elements, and distinctive qualities (Storbeck & Clore, 2005). Storbeck and Clore (2005) based their predictions on that individuals in positive moods see connections, focus on global rather than local aspects of what they see, and process incoming information in relation to currently accessible concepts (Storbeck & Clore, 2005). In contrast, individuals in negative mood resist the influence of accessible scripts and stereotypes; focus on local rather than global aspects of what they see, and generally process incoming information independently of currently accessible concepts (Storbeck & Clore, 2005).

Their result was consistent with their predictions; individuals in negative moods were significantly less likely to show false memory effect than those in positive mood or those whose mood was not manipulated. So, positive

moods gave the same results as neutral mood, so their findings primarily reflect the impact of negative affect on the false memory effect. Storbeck & Clore (2005) also provide evidence that mood influenced the accessibility of lures at encoding, rather than influencing monitoring at retrieval of whether lures were actually presented.

Wright et al. (2005) also examined negative mood in relation to false memories by manipulating mood and using the DRM procedure. They also compared the amount of false memories with dissociation. They found that mood was related to false memories, but it was dependent on the specific task demands. Participants in negative mood were less likely than those in positive moods to have false memory, when they were told to recall as many words as they felt like recalling. When they were told to recall as many words as they could, participants in negative mood had more false memories. Dissociation was not associated with false memories. Wright et al. (2005) explain their results by the mood-as-input hypothesis. If people are told to recall as many items as they can, then they have to judge how many they have recalled and if they are satisfied with this. Wright et al. (2005) argues that people in negative mood will interpret their mood as meaning that they are not satisfied with the performance and continue trying to recall words. For those in the positive mood will the opposite be true, they will interpret positive mood to mean they are satisfied with their performance and finish.

These various empirical results show that how affective states might influence false memory effect is up to this date unsure.

2.5 Personality Characteristics Related to False Memory Effect

Over the past years, several studies have looked at how personality characteristics relates to false memory effect with unequal results. For example, Geraerts et al. (2005) found that fantasy proneness was related to false recall and false recognition. In contrast, fantasy proneness has in

another study been related to superior recognition performance (Horselenberg, Merckelbach, van Breukelen, & Wessel, 2004). Dissociation is also an individual difference variable that has been tested. Winograd, Peluso, and Clover (1998) showed that self-reports of high degrees of dissociative experiences correlated with enhanced false recall and false recognition. Curiously enough, Wright et al. (2005) found that dissociation was not associated with false memories. In distance to these results, this current study will in addition to depression and anxiety look upon fantasy proneness and dissociation in relation to false memory creation.

2.6 Hypothesis

In the present study, neutral- and depression-related DRM lists were used to investigate whether participants who had higher scores on the individual variables we tested, displayed higher rates of false recognition for neutral and depression-related critical lures relative to other participants. More specifically, are individual differences in depression, anxiety, fantasy proneness and dissociation connected to false recognition in the DRM task? Based on recently studies as outlined before, no clear predictions can be made concerning the extent of false recognitions and depression. By using depressive-related DRM lists we also could investigate the mood-congruency effect. Though some recently studies call for some caution regarding mood-congruent bias, it was hypothesized that participants with depressive symptoms should recognize more mood-congruent words (i.e., depression-relevant words).

3. Method

3.1 Participants

Sixty seven participants (45 women and 22 men, mean age 26,6, SD = 8,1) from the University of Oslo volunteered to take part in the experiment. They

were recruited via oral advertisement for the research at lectures in psychology, advertisement on the internet or posters at campus. Participants included undergraduates and employees. They were asked to fill out several questionnaires and to accomplish a cognitive task. They were not informed about the specific hypothesis being tested. First, participants filled out BDI-II, BAI, CEQ and DES. In the end of the session, participants completed a DRM task. All participants gave informed consent to participate and were told that they could withdraw from the experiment at any point.

3.2 Materials

The following four questionnaires were administered in pencil-and-paper form in the order given below.

3.2.1 Dissociative Experience Scale

The Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986; Carlson & Putnam, 1993) is a 28-item, self-administered questionnaire measuring tendency toward dissociative phenomena (e.g., feelings of derealization, depersonalization, and disturbances in memory). Some items relate to common dissociative experiences (e.g., driving and not recalling the trip), whereas others relate to more severe dissociative experiences (e.g., out-of-body experiences). Participants were asked to place a cross in a box that indicated what percentage of the time this happens to them, ranging from 0% to 100% at 10% intervals. The DES yields a single score of degree of dissociation and its reliability, internal consistency, and construct validity have been demonstrated (Porter, Birt, Yuille, & Lehman, 2000). DES is designed for non-clinical samples (Wright & Loftus, 1999), but in clinical contexts, a DES score of 30 or greater suggest the presence of a dissociative disorder (Bernstein & Putman, 1986; Porter et al., 2000).

3.2.2 Beck Depression Inventory -II

All participants filled out Beck Depression Inventory (BDI-II; Beck, Steer and Brown, 1996). BDI-II is a reliable and widely used self-rating questionnaire consisting of 21 items that assess the levels of depressive symptoms present in the past 2 weeks (Beck et al., 1996). This new revised edition replaces the BDI and the BDI-1. Examples items are: "I am so sad and unhappy that I can't bear it anymore" and "I have totally lost interest in other people or thing". There is a 4-point scale where the items are scored (range 0-3) and scores are summed to obtain a total score, with higher score reflecting higher levels of depressive symptoms (Horselenberg et al., 2004). Total score of 0-13 is considered minimal range, 14-19 is mild, 20-28 is moderate, and 29-63 is severe.

3.2.3 Beck Anxiety Inventory

Beck Anxiety Inventory (BAI; Beck & Steer, 1993) is a brief self-rating questionnaire designed to measure symptoms of anxiety which are minimally shared with those of depression. 21 items represents an anxiety symptom that is rated for severity on a 4-point Likert scale (0-3), ranging from Not at all to Severely; I could barely stand it. The participants were instructed to range how much they had been bothered by each symptom during the last week, including today. Total score of 0-7 is considered as minimal range, 8-15 is mild, 16-25 is moderate, and 26-63 is severe.

3.2.4 Creative Experiences Questionnaire

The Creative Experiences Questionnaire is a 25-item yes/no index of fantasy proneness. Wilson and Barber (1982) provided CEQ items derived from the extensive case descriptions of fantasy proneness. Typical CEQ-items are: «In general, I spend at least half of the day fantasizing or daydreaming» and «My fantasies are so vivid that they are like a good movie». 'Yes' answers are summed to yield a total CEQ score with higher scores indicating higher

levels of fantasy proneness. CEQ possesses adequate reliability in terms of internal consistency and test-retest stability (Merkelbach, Horselenberg, & Muris, 2001).

3.3 A Version of the Deese-Roediger-McDermott Procedure

The cognitive task was based on the procedure developed by Deese-Roediger-McDermott (DRM), which has frequently been used for examining false memories since those authors showed that people will falsely report hearing a word if they are presented with semantically related words (Deese, 1959, Roediger & McDermott, 1995). The procedure involves presenting an lists of words; the words on each list are highly associated with a single, non presented word, referred to as a critical lure (Roediger & McDermott, 1995). Roediger and McDermott's material were used as a template for making neutral and depressive DRM lists in Norwegian. 10 neutral lists were generated using the principle that the lists were composed of 10 words presumed to be most strongly associated to the critical lure. Similarly, 10 depression-related critical lures were chosen and lists generated. All lists were tested on pilot participants, and some lists were adjusted or replaced to increase the production of critical lure. The final stimulus material is presented in Appendix.

The DRM task was run in three phases; a study phase, some Raven's matrices as filler task, followed by a recognition test. The two latter had no time limit. The study phase contained 20 lists (10 neutral and 10 depression-related) presented on a computer screen. The lists of words were presented sequentially with no delay between words. The second task was a filler IQ test. The third a recognition test consisted of 120 words; 60 (30 depressive-related and 30 neutral) had been presented in the study phase and obtained by selecting items on serial positions 1, 8 and 10 from each studied list. Each critical lure items (20 words) were presented and also 20 words weakly related to each list and 20 words unrelated to any words on the list. The items were randomly presented by an E-Run Prime script. In

total, 7 participants took part in piloting procedure. By using the Oslo Corpus (<http://www.tekstlab.uio.no>), which contains 18.5 million words, it was established that the mean word frequency was 573,1 (SD=260,52) for the depression-related critical lures, and 454,7 (SD=393,93) for the non-depression related, $t(18) < 1$, ns. The mean word length was 5,9 (SD=1,66) and 4,8 (SD=1,14) letters, respectively, $t(18) < 1$, ns.

3.4 Design and Procedure

All participants were initially told that this was a study designed to test how individual differences influence our memory. Participants completed the questionnaires and the DRM procedure and were then given a scratch card worth 25 NOK. All participants were tested individually during a session that lasted for 1 hour.

The experiment involved a within-subjects design, with the independent variables of Wordtypes (levels of Critical Lure, New, Old) and Valence (levels of Depression and Neutral). Participants were given oral and written instructions that they would see several word lists on a computer screen, and that it was important to concentrate and to be attentive. They were told that their memory for these word lists would be tested afterwards. List items were presented with the strongest associates occurring first, at a rate of 1500 msec per item. Between each list there was a page that only showed «-». The second part of this study was a filler task, an IQ test, where the participants were told to find the correct missing part (8 alternatives) of a pattern. The third and last part of the study was the recognition test. The participants were instructed that they would be presented with several words, one at a time, and that some of these words had been presented in the first task. The word would remain on the screen until they made their decision. They were told to decide whether each word was «old», i.e. which they had seen previously during list presentation or «new» i.e. that had not previously presented.

For obtaining the participants judgments about their phenomenological experience while recognizing non presented items, we used a well-known procedure where participants distinguished between two states of awareness from the past: remembering and knowing (Tulving, 1985; in Roediger & McDermott, 1995). The participants were told to make an additional judgment for each item judged to be old: whether they Remember or Know that the item occurred in the study list. Roediger and McDermott (1995) defined a Remember experience as one in which the subject can mentally relive the experience. When participants are confident that the item occurred on the list but unable to reexperience (i.e., remember) its occurrence, this is defined as a Know judgment. If the participants were able to recollect something specific from the moment they saw the word during the list presentation, they should assign a Remember judgment to the test word. If they were unable to recollect its exact moment of occurrence, but knew that the word had been on the list, they should assign it as a Know judgment. If the participants were insecure whether the word had been presented before or not, this was instructed to be a Guess judgment. All instructions were explained in detail by the experimenter, as well as on the screen.

4. Results

First, we look at the individual variables (BDI, BAI, CEQ and DES) and the number of false recognitions on the DRM task. The percentage of recognition (Remember/Know responses for critical lures, both depressive and neutral) served as the dependent variable. Correct recognition (i.e., mean proportion of recognition of studied words), false recognition of critical lures and nonstudied words other than the critical lures, were tested. Results computed that all participants performed satisfying rates of correct recognition. Overall, studied words were recognized at a rate of xx%. Finally, we examine the mood-congruency effect.

4.1 Self-Report Scores and False Recognition Rate

Table 1 show the scores obtained on the various questionnaires for measuring depression, anxiety, fantasy proneness and dissociation. The data in Table 1 also presents the proportion of false recognition on the depression-related and neutral critical lures.

Table 1

Psychometric data of BDI, BAI, CEQ, DES, and depression-related and neutral critical lures.

	Minimum	Maximum	Mean	Std. Deviation
Depression-related lures	1	10	3,7	2,4
Neutral lures	1	11	4,7	2,6
BDI	0	33	9,6	7,3
BAI	0	40	8,8	8,4
CEQ	0	17	8,3	3,7
DES	.95	55,4	12,6	8,6

4.2 False Recognition of Depression-Related and Neutral Lures

To test whether participants with higher scores on BDI, BAI, CEQ and DES displayed higher levels of false recognition on the DRM task, we computed the false recognition rate (false recognition of neutral and depression-related critical lures). Table 2 shows Pearson correlations between false alarms for critical lures, depression, anxiety, fantasy proneness and dissociation. As can be read in Table 2, only BAI score correlated significantly with the number of depression-related and neutral critical lures, whereas BDI only correlated significantly with the numbers of neutral critical lures. Pearson correlations between the BDI, BAI, CEQ and DES and the cognitive measures gave the following pattern: BAI scores correlated positively with the production of depression-related and neutral critical lures, $r = .24$, and $r = .21$, respectively, $ps < .05$. Scores on BDI correlated non-significantly with the production of depression-related critical lures, $r = .19$, and positively for neutral, $r = .27$, respectively, $ps < .05$. CEQ scores correlated non-significantly with the production of critical lures; for depression-related,

$r = .03$, and for neutral, $r = .02$. Scores on DES correlated non-significantly with depression-related critical lures, $r = .17$, but positively with neutral, $r = .27$, $ps < .05$.

Table 2

Pearson product-moment correlations between depression (BDI), anxiety (BAI), fantasy proneness (CEQ), dissociative symptoms (DES), and false recognition on depression-related critical lures, neutral critical lures and depression/neutral lures.

	BDI n = 67	BAI n = 67	CEQ n = 66	DES n = 67
Depression-related lures	.196	.245*	.034	.176
Neutral lures	.270*	.217*	.022	.275*
Depression/neutral lures	.262*	.257*	.031	.254*

*Correlation is significant at the .05 level (1-tailed).

Table 3

Pearson product-moment correlations between depression (BDI), anxiety (BAI), fantasy proneness (CEQ), dissociative symptoms (DES), and correct recognition on depression-related studied words, neutral studied words.

	BDI n = 67	BAI n = 67	CEQ n = 66	DES n = 67
Depression-related studied words	-.016	-.047	.035	.158
Neutral studied words	.196	.285*	.076	.082

*Correlation is significant at the .05 level (1-tailed).

4.3 Recognition Accuracy

Pearson correlations between correct recognition (Remember/Know responses) for depression-relevant- and neutral studied words and the individual difference measures (BDI, BAI, CEQ and DES) were calculated (see table 3). There were no relation between higher scores on BDI and more correct recognition for depression-relevant studied words. It appeared that anxiety (BAI) was related, but only to neutral studied words.

5. Discussion

The purpose of this study was to determine whether high scores on depression, anxiety, fantasy proneness and dissociation would show enhanced false recognition on neutral and depressive-related critical lures in the DRM paradigm. Our result replicate the robust false recognition effects typically found with the DRM paradigm (Roediger & McDermott, 1995).

To our surprise, the results revealed that only anxiety (BAI) correlated with false recognition for both neutral and depressive-related critical lures. Depression (BDI) only correlated with false recognition for the neutral critical lures, thus no significant correlation with depressive-related critical lures. Although, the anxiety results were not very surprising considering that previous research (Zoellner et al, 2000) has linked anxiety to the false memory effect. The present result for depression was in line with the various results of depression and the false memory effect.

We found no evidence for fantasy proneness and false memory creation. Dissociation correlated positively with the false memory effect, a finding that fit well with results from several other studies (Hyman & Billings, 1998; Wilkinson & Hyman, 1998; Winograd et al. 1998; Clancy, Schacter, McNally, & Pitman, 2000). Similarity to more recent research, we found no statistically significant better memory for depression-related words with dysphoria, thus no mood-congruency effect. Instead, the results revealed that anxious participants remembered significant better neutral words.

The present results for depression and anxiety in association to the false memory effect; the effect of co-existing depression and anxiety; and in the end, depression- and anxiety mood-congruency effect, is further discussed.

5.1 Depression and the False Memory Effect

As noted, depression correlated only to neutral critical lures and not with depressive-related. Since anxiety correlated with depressive-related critical lures the absence of false recognition for depression is of special interest.

5.1.1 Absence of False Recognition on the Depressive-Related DRM lists

The DRM lists which was derived for the current research was perhaps not so depressive-related after all. In addition, not all depressive-related words captured the same mood. BDI correlated with neutral critical lures, but those may have been more self-referential than the depressive-related lists.

However, the literature is not consistent in the support whether the stimuli material must be self-referential. Moritz et al., (2005) used only four DRM lists when they examined mood congruent true and false recognition, thus narrowing the range of depressive preoccupations. The lists did not differ regarding associative strength and word length, but it may have differed in other aspects. The present study used multiple lists of both depression-related and neutral, to eliminate this concern.

In the literature, smaller effect for recognition of emotion-related words is somewhat «old news». The smaller effect may have to do with the emotional distinctiveness of the depressive-related words. Pesta, Murphy, and Sanders (2001) show that participants misremembered neutral lures more often than they did emotional lures. In general, this indicates that emotional critical lures are subject to false remembering in the DRM task but at a lower rate than neutral critical lures. In the present study we found no significant effect, but this may be due to other factors, like statistical power, that will be explained below.

One interesting question is whether this subjectively vivid encoding also corresponds with a reduction in memory distortion (Schacter, Gallo, & Kensinger in press). This hypothesis seems to be supported in a number of

studies. For example, participants who studied a list of words orthographically associated with a nonpresented lure word, were less likely to falsely recall or to falsely recognize the lure word if it was emotional (e.g., to endorse rape after studying cape, nape, tape) than if it was neutral (e.g., hook after studying book, look, cook; Pesta et al., 2001). Manipulations in distinctiveness were also related to this, like including other emotional items at encoding (thereby decreasing the distinctiveness of the emotional lure words) increased the likelihood of false recognition (Pesta et al., 2001). Overall, these results supports that individuals can use the distinctiveness provided by emotion to reduce their rates of false recognition (Schacter et al. in press). The majority of the studied items were in these studies neutral, so Schacter et al. (in press) warned that the emotional lures may have been rejected due to their conceptual incongruence with the studied item instead of specific effects of emotion. In the current research there were equal numbers of depressive-related and neutral words/lures. Anyway, we do not know if the participants interpret them in the same way. Hence, we do not know whether it was emotion that triggered that depression only correlated with false recognition for neutral critical lures and not depressive-related due to the distinctiveness provided by emotion, or if it was other factors that affected.

5.1.2 Statistical Power

Another possible explanation for the absence of false recall for depression on the depressive-related critical lures may be the statistical power. The lack of significant correlation between depression and false recognition for depressive-related critical lures can be attributed to the relatively small number of participants displaying high scores on the BDI questionnaire (n=15, of whom 2 scored in the serious depressive range). To comparison, the sample size of participants displaying higher degrees on the BAI questionnaire where major (n=26, of whom 5 scored in the serious anxiety range). The subclinical levels of depression may not have been sufficient to result in significant memory deficiencies for depressive-related critical lures.

However, small sample sizes in depression and false memories studies is not rare, and may be due to the difficulty in collecting data from individuals with depressive symptoms.

5.2 Anxiety and the False Memory Effect

Surprisingly, while depression only correlated with neutral critical lures, was anxiety related to false recognition of both neutral and depressive-related critical lures. Anxiety is like depression associated with cognitive performance deficits, including those involving memory (e.g. Mueller, 1992). As noted before, Zoellner et al. (2000) found that false recall was related to trait anxiety. Like depression, source monitoring was one theory for false memory creation with anxious individuals. Despite that we designed DRM lists for depression-related words resulted this in a significant false recognition only for anxious participants.

5.2.1 *Anxiety-Related Instead of Depression-Related?*

One explanation for the significant correlation between anxiety and false recognition for depression-related lures can be that the DRM lists were more anxiety-related than depressive-related. In hindsight, several of the lists were anxiety-related with critical lures like *worried, shame, sleep, future, success, problem* and *health*. Depression is associated more with past events than future events, whereas the opposite is true for anxiety (Eysenck, Payne, & Santos, 2006). The hypothesis that anxiety is associated with danger events, whereas depression is associated with loss events has received reasonable support (Eysenck et al., 2006). One assumption is therefore that the depression-related words were more triggering to the anxious than the depressive participants because the depression-related DRM lists may be associated with more future, threatening events.

There are, however, other theories than source-monitoring framework that is put forth to address this question. One theory proposed by Eysenck &

Calvo (1992) postulates that anxiety affects information processing in two quite different ways. For example, worry may elicit task-irrelevant cognitive activity and therefore consumes anxiety processing resources within working memory (Baddeley, 1986). Moreover, their concern to avoid poor performance motivates anxious individuals to invest greater effort in task performance to compensate for their capacity limitations (Macleod & Mathews, 2004). This may lead anxious individuals to perform as well as, or even better than, nonanxious individuals if the task is not too demanding (Macleod & Mathews, 2004). On the other side, if a task places high demands on temporary storage capacity, performance of anxious participants likely suffers (Macleod & Mathews, 2004).

Several studies (e.g. Darke, 1988) have supported these predictions. Participants with high levels of anxiety are more likely than nonanxious to let threatening words hold their attention (Fox, Russo, Bowles, & Dutton, 2001; Yiend & Mathews, 2001). This can result in worse memory if attention to threat during encoding results, for example, principally in registration only of aversive quality of the feelings evoked, then there may be fewer distinctive features within the memory representation to help in later recall (Macleod & Mathews, 2004). This may also give the opposite effect; if attention to threat during encoding is accompanied by subsequent processing of the distinctive meaning of the emotional information, then its later recall is likely to be enhanced (Macleod & Mathews, 2004). In the current study, the depressive-related words perhaps was experienced as threatening for the anxious participants and this elicited task-irrelevant cognitive activity. Moreover, this is followed by poorer memory for these words and susceptibility for false recognitions.

5.3 Depression and Anxiety – Distinct Conditions?

Like previous research has revealed, the findings of depression, anxiety and susceptibility to false memory creation have been various and diffused. There may be several reasons for these inconsistent results. The existence

of «pure» depressive states may be quite rare, and still we do not understand the frequency and diagnostic significance of comorbid conditions (Clark et al., 1999). Comorbidity can be referred to as high rate of coexistence with other types of psychiatric condition or disease (Clark et al., 1999). Depression and anxiety have received most empirical attention; roughly 50% of clinically depressed or anxious individuals may have a coexisting anxious or depressive disorder (L.A Clark, 1989). High correlations between measures of anxiety and depression has been shown in several studies, and some researchers argues that these symptom measures do not assess distinct anxiety and depression construct but rather a single common general distress or negative affect dimension (e.g., Feldman, 1993).

Some authors have earlier warned that high BDI scores may not indicate depression, because depression is highly correlated with other measures of psychopathology in these groups (Gotlib, 1984; Tanaka-Matsumi & Kameoka, 1986). In students groups, high BDI scores may represents diffuse maladaptive functioning, or transient negative affect, instead of depressive psychopathology (Sacco, 1981). Therefore, college students with high BDI scores may present a higher number of false-positive depression diagnoses than a clinical sample. Following this reasoning, it can be argued that the depressed participants in the current study also displayed high scores on anxiety and reverse, and it also may be high false-positive scores that do not display depression.

On the other hand, studies have also shown that self-reports measures like the BDI and BAI can distinguish between depression and anxiety (e.g., D.A Clark, Beck & Stewart, 1990; Cox, Swinson, Kuch, & Reichman, 1993). Moreover, in the current study we used the revised BDI-II, where research show that the content validity has been improved by following DSM-IV criteria (Beck, Steer, Ball, & Ranieri, 1996).

The overlap in many of the symptoms that defines depression and anxiety

can be one reason for the high comorbidity as well as the high correlation anxiety and depression symptom measures (Brady & Kendall, 1992). Common and distinct symptoms of depression and anxiety, is up to this date unsure. Some research has shown that symptoms such as irritability, restlessness, difficulty concentrating, insomnia, crying, general distress, decreased activity, poor social skills, helplessness, worry, and low self-efficacy have been considered as common to both disorders (Alloy, Kelly, Mineka, & Clements, 1990; L.A. Clark, 1989). Depression is distinguished by symptoms such as loss of pleasurable engagement with the environment, disinterest, low motivation, and social withdrawal (Watson & Kendall, 1989), and physiological arousal specific to anxiety (LA. Clark, Watson, & Mineka, 1994). However, these findings have not been supported in all research (Clark et al., 1999). The comorbidity of anxiety and depression is an important issue for the present study; we ideally want to investigate them separately. Hence, it is difficult to conclude from the present results whether the false memory effect is affected by depression, anxiety or maybe both.

Another perspective is that viewing individuals with depressive symptoms as a single group, one is courting greater variability in performance scores due to the general variance in depressive core symptomatology (Kizilbash, Vanderploeg & Curtiss, 2002). For example, depressed individuals may or may not exhibit sleep abnormalities, reduced appetite, hopelessness, helplessness, psychomotor retardation, or even depressed mood itself (Kizilbash et al, 2002). These interindividual differences, in addition to the normal variation of cognitive abilities, tend to enhance the variance of test scores more so than normal populations (Veiel, 1997).

In summary, it is possible that the observed difference between anxiety and depression were not significant because the methodology used to identify depressive or anxious mood was not stringent enough.

5.3.1 The Effect of Co-Existing Depression and Anxiety

So, what happens to false memory when depression and anxiety coexist? The present study did not explore that question. However, there are studies that suggest that those experiencing high levels of co-existing depression and anxiety are more likely to have immediate and delayed memory difficulties than individuals reporting either depressive or anxious symptoms alone, or those with low levels of both (Kizilbash et al., 2002). The uncertainties raised by previous research on depression and false memory effect may be clarified of these findings. The present result found correlation with both anxiety and depression, Brennen et al. (in press) that found a correlation between depression and false memory creation, whereas Zoellner et al. (2000) found anxiety instead of depression. Perhaps these inconsistent results may be due to this comorbidity, indicating that individuals with coexisting depressive and anxiety symptoms are prone to false memory effect. Future studies should address these additional questions that were not explored within the framework of the present study. For example, if co-existing anxiety and depression are more prone to the false memory effect than individuals reporting depressive or anxiety symptoms alone, or those with low levels of both, this could have significant impact for understanding these disorders.

5.4 Depression, Anxiety and Mood Congruency Effect

As outlined before, if we present positively and negatively affective words in a first experimental task and later the participants have to recognize those words (see the meta-analysis by Matt, Vázquez & Campell, 1992), chances are good that recall will in some way be congruent with mood. In line with several recent studies, the present study did not find any significant correlation for mood congruency effect, predicting that depressed participants display superior memory performance of depression-related material relative to neutral material. There may be two assumptions when interpreting these results. First, the depressive-related DRM lists may not

been so depressive-related after all. As described above, the content of stimuli may be labeled as sad, unpleasant or negative, but perhaps not specifically depressive that is needed for the self-referent encoding of stimuli.

Research has also shown the opposite effect with dysphoria. Dysphoric individuals have shown a more balanced recall of affectively toned stimuli, where they recalled fewer positive words, but the same number of negative words as nondysphoric individuals do (Matt et al., 1992). Balanced recall can be explained in a more general phenomenon labeled as depressive realism, which implies that subclinically depressed participants have a more realistic view of their environment and are less sensitive to perceptual and judgmental biases than normal nondepressed persons (Matt et al., 1992). Our results are not statistically significant, but support these findings. The present study employed a recognition task, more studies have used free recall procedures and this may be a more robust method for eliciting the mood congruency effect (Matt et al., 1992).

As suggested, BDI may not measure only depression but also other psychopathology. The second assumption, in the case of mood congruency effect, is that higher BDI scores do not identify a negative mood or positive mood, as the specific component associated with differential recognition. In the present study we just assume that a higher BDI score is related to a negative mood. This explains, however, not the absence of mood-congruency effect if high BDI scores reflect transient negative affect rather than depression. Mood-congruent effect is often obtained in non-clinical samples through mood induction manipulations. If high BDI scores reflect false-positive scores without this implying a negative affect, this may explain the absence of mood congruency effect.

The absent mood-congruency effect suggest three possible scenarios. First, the DRM lists were perhaps not self-referent enough to trigger it. Secondly, it is possible that higher degrees in BDI measurement did not reflect

negative mood in participants that obtained high scores in this measure. Third, the result is consistent with the depressive realism that earlier research has observed in dysphoric patients. Further, we do not know whether negative mood and depression are distinct constructs. If so, then BDI may be appropriate to study the question of depression-related deficits in memory, but inappropriate to study the question of mood-congruent memory bias. In addition to BDI should there be more information on mood, this applies to most studies that use depressed mood (both clinical and subclinical) and mood induced studies.

As noted, anxious participants remembered neutral words significant better. This is interesting in circumstance to the previous described theory of information processing with anxious individuals by Eysenck & Carvo(1992). As this theory postulates, worry can motivate anxious individuals to perform even better than nonanxious, if the task is not too demanding. In fact, this can be a possible explanation for why anxious individuals correctly remembered significantly more neutral words, and why this possible mood-congruency effect did not occur on depressive-related words. When anxious studied neutral words, these could be experienced as a non threat, and thus did their possible concern for poor performance affected them to concentrate and remember more. However, when attention to threat stimuli, like the depression-related words, worry may elicit task-irrelevant, over-activated cognitive activity and this may result in poorer memory.

6. Conclusion

In this paper we used the most common laboratory technique for eliciting false memories and explored whether depression, anxiety, fantasy proneness or dissociation make people more prone to the false memory effect. Our most important finding was the effect of anxiety for false recognition of both depressive-related and neutral critical lure, whereas depression only correlated for neutral lures.

As postulated, increased susceptibility to false memory effect may be due to a deficit in source monitoring. In the literature, several researchers argue that the DRM procedure can be conceived as a source monitoring task (e.g., Schacter, Verfaellie, & Pradere, 1996). If so, the present results indicates that participants with depressive or anxious symptoms (or maybe both!) may have a general source monitoring deficit. Other source monitoring paradigms should be used to explore this closer. Future research should also explore source monitoring in relation to anxiety-related and depressive-related material, in addition to more depression measurements as clinical interview. It would be very interesting to study false memory in relation to coexisting anxiety and depression.

As presented in the introduction, it is important to note that the present results should not be misinterpreted to suggest that anxious individuals are more susceptible to generate false memories for negative events themselves. However, it was speculated that the false memory creation with depressive and anxious individuals could explain the development and maintenance of the affective disorder- in line with the hypothesis derived from Beck's cognitive theory. The fact that individuals with depressive and anxiety symptoms possess a number of false recognition on the DRM task does, however, not in and it self demonstrate that this approach is of value in producing and understanding anxiety and depression. Finding that individuals with higher scores on depressive measurement, such as BDI, or anxiety measurement, such as BAI, simply says that highly depressive, anxious individuals are more likely to have false memory bias, is correlational evidence. Actually, it may reflect the impact of high depression/anxiety on cognitive processing rather than reverse.

Roediger and McDermott (1995) suggested that false memory effect that are achieved in a relative simple, intentional learning task with immediate recall, then this phenomenon may be even more pronounced in real-life settings. The issue of whether laboratory studies should be generalized to real world's settings is an important question. However, a wide range of

false memory research has advanced our understanding of false memories in the real world. Wade et al. (2007) make an important note when reminding that psychological science as other scientific domains tries to understand behavior from the real world by bringing it into the laboratory, not the other way around.

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Appendix: The 20 10-words lists and their critical items.

Depression-related lists

Trist
 Alvorlig
 Gråt
 Deprimert
 Matt
 Ulykkelig
 Nedstemt
 Bedrøvelig
 Lei
 Melankolsk
 Håpløst

Bekymret
 Engstelig
 Urolig
 Råd vill
 Ubesluttet som
 Pessimistisk
 Følsom
 Skvetten
 Skjelven
 Svett
 Plage

Skam
 Flau
 Skyld
 Usikker
 Angre
 Rødme
 Unnskyld
 Aksept
 Ynkkelig
 Ydmyk
 Sosial

Sove
 Trøtt
 Drømme
 Seng
 Hvile
 Dyne
 Sliten
 Leggetid
 Snorke
 Mareritt
 Våkne

Fremtid
 Håp
 Planer
 Drømmer
 Mål
 Ambisjoner
 Lyst
 Tid
 År
 Svart
 Liv

Lykkelig
 Glad
 Smil
 Latter
 Entusiastisk
 Henrykt
 Positiv
 Fornøyd
 Flire
 Tilfreds
 Vits

Neutral lists

Frukt
 Plommer
 Grønnsaker
 Appelsin
 Syltetøy
 Dessert
 Bananer
 Blåbær
 Kirsebær
 Juice
 Salat

Brød
 Mat
 Smør
 Loff
 Spise
 Melk
 Skive
 Kniv
 Korn
 Kake
 Ost

Kaldt
 Varmt
 Snø
 Vinter
 Is
 Våt
 Kjølig
 Vær
 Fryse
 Frost
 Rim

Føtter
 Tå
 Kroppsdeler
 Skolisser
 Sparke
 Sandaler
 Sokker
 Jogge
 Ankel
 Lukt
 Fotball

Musikk
 Toner
 Noter
 Piano
 Sangstemme
 Radio
 Band
 Melodi
 Konsert
 Instrument
 Rytme

Hus
 Hytte
 Hjem
 Bolig
 Hage
 Villa
 Tak
 Bo
 Bygning
 Rom
 Gård

Depression-related lists

<i>Suksess</i>	<i>Helse</i>
Medalje	Doktor
Stolt	Ernæring
Oppnå	Syk
Gratulasjoner	Medisiner
Tale	Trening
Venner	Konsultasjon
Rik	Smerte
Bukett	Resept
Viktig	Ryggen
Diplom	Tobakk

Problem
Krise
Dilemma
Gruble
Overveie
Alternativer
Handlingslammet
Løsning
Vanskelig
Rådvill
Tenke

Mørk
Sort
Katt
Natt
Vinter
Redd
Død
Uhyggelig
Skummelt
Begravelse
Lys

Neutral lists

<i>Vindu</i>	<i>Konge</i>
Dør	Krone
Glass	Dronning
Rute	Prins
Skygge	Harald
Karm	Statsoverhode
Gardiner	Slott
Åpent	Trone
Leilighet	Monark
Utsikt	Sjakk
Bris	Leder

<i>Nål</i>	<i>Lege</i>
Tråd	Sykepleier
Sy	Syk
Øye	Sykehus
Skarp	Pasient
Spiss	Stetoskop
Stikke	Operasjon
Sprøyte	Klinikk
Arm	Medisin
Torn	Kontor
Injeksjon	Kirurg